

PHARMACOGNOSTICAL STANDARDIZATION OF ROOTS AND

RHIZOMES OF *COLLINSONIA CANADENSIS*

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ABSTRACT

Collinsonia canadensis is a perennial medicinal herb in the mint family. Common names include Canada Horsebalm, Richweed, Hardhack, Heal-All, Horsetweed, Ox-Balm and Stoneroot. Traditionally the roots and rhizomes of the plant are used for various diseases. The pharmacognostical study and parameters related to physicochemical properties of plant including macroscopy, microscopy (transverse section and powder microscopy), quantitative studies, foreign matter, ash values, extractive values, loss on drying have been assessed for roots and rhizomes of the plant as no work was done on standardization of plant. In a view to standardized the plant this study was carried out.

KEYWORDS: *Collinsonia canadensis*, Traditionally, Pharmacognostical, Physicochemical, Standardisation

INTRODUCTION

Collinsonia canadensis is a perennial medicinal herb in the mint family. Common names include Canada Horsebalm, Richweed, Hardhack, Heal-All, Horsetweed, Ox-Balm and Stoneroot. It is native to eastern North America from Quebec south to Florida and as far west as Missouri, although it is mainly found east of the River Mississippi. *Collinsonia canadensis* contains tannins, resins, mucilage, caffeic acid derivatives including rosmarinic acid and alkaloid^{1,2}. *Collinsonia canadensis* was applied topically for number of dermatological issues, including boils and swollen breasts, and as a treatment of headaches. As a leg and foot soak, it was also considered useful in rheumatism. Internally, decoction of the root was used for kidney or heart troubles^{3,4}. The flowers and leaves are often used as a fragrant deodorant, and an infusion of aerial parts used for headaches and rheumatism⁵.

MATERIALS AND METHODS

Collection and Extraction

The roots and rhizomes of *Collinsonia canadensis* were purchased from Natural Botanicals Ghaziabad in July 2013 and were authenticated by the Dr. Sunita garg, chief scientist of CSIR-NISCAIR, New Delhi. A voucher specimen no (C. C-1) is deposited in the departmental herbarium of G. H. G. Khalsa College of Pharmacy, Gurusar Sadhar, Ludhiana. The roots and rhizomes were dried in shade and coarsely powdered.

Macroscopic and Microscopic Studies

The macroscopical characters of the root were studied by following standard methods^{6,7}. The powder was rubbed slowly between fingers and odour was examined. Taste of the powder was also checked. Surface and fracture of root and rhizomes was touched and observed to determine whether it was soft or hard. Transverse section of root and rhizome and powder characteristics were identified with routine reagents such as chloral hydrate, glycerine, safranin solution, fast

green, phloroglucinol, hydrochloric acid, lactophenol and iodine solution etc to study the lignified cells, fibre, xylem vessels, starch grains, calcium oxalate crystal etc. Permanent slide of TS of root was prepared to observe the presence and arrangement of cellular structures as per the procedure of Johansen⁸ and the representative figures were taken with the help microscopic image camera.

Physico-Chemical Parameters

The ash values including total ash, acid insoluble ash and water soluble ash and moisture content using loss on drying method were determined as per the Indian Pharmacopoeia⁹. Extractive values with various solvents like alcohol and water were performed as per standard procedure¹⁰.

Quantitative Studies

Foreign organic matter, length and width of xylem vessels, fibres, calcium oxalate crystals and diameter of starch grains etc were noted as per standard procedures^{11, 12}.

RESULTS AND DISCUSSIONS

Macroscopy

The colour of pieces of roots and rhizomes were internally creamish to greyish white and dark brown externally. Odour was disagreeable with pungent taste. Shape was irregular with variable size. Upper side bearing short and conical buds and clear scars of aerial stems underside bearing short thread like roots or their hollow scars. Fracture of the drug is very hard. (plate 1)



Plate 1: Roots and Rhizomes of *Collinsonia canadensis*

Microscopy

After preparation of slide using chloral hydrate and glycerine and examine under microscope fragments of cork, cellulosic parenchyma; reticulate or pitted type xylem vessels and pitted tracheids were observed. When stained with phloroglucinol and hydrochloric acid fragments of ligneous parenchyma, lignified fibres and vessels were seen. When the powdered drug was cleared with chloral hydrate and mounted in lactophenol followed by iodine solution showed small, kidney shaped, ovoid or oblong starch grains.

Physico-Chemical Parameters

Total ash, acid insoluble ash, water soluble ash, loss on drying, alcohol soluble extractive value and water soluble extractive value were found to be 8.0 percent, 0.8 percent, 0.3 percent, 11percent maximum, 11.3 percent and 8.33 percent respectively.

Quantitative Studies

Foreign organic matter was found to be 0.2 percent.

Table 1

Parameter	Mean Length	Mean Width	Mean Diameter
Xylem vessels	253.3 μ	40.31 μ	-
Phloem fibres	299.94 μ m	34.33 μ m	
Calcium oxalate crystals	14.5 μ m	10.2 μ m	
Starch grains	-	-	40 μ m

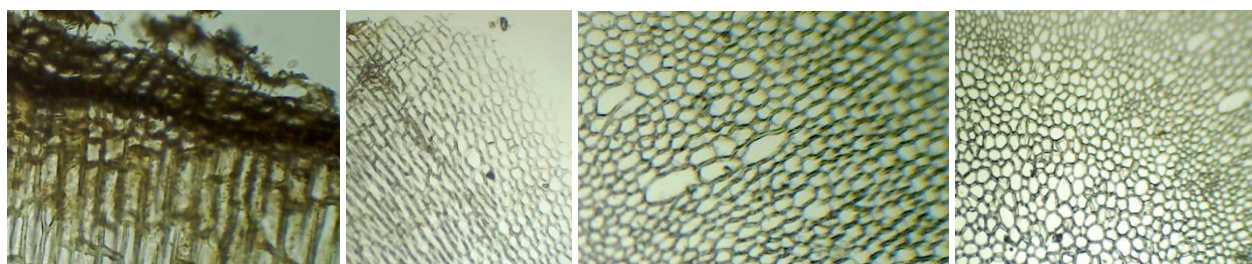


Figure 1

Figure 2

Figure 3

Figure 4

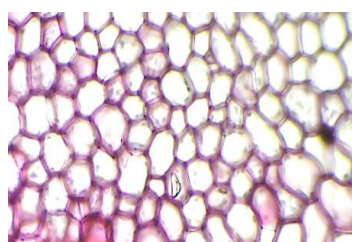


Figure 5

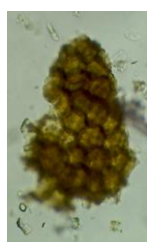


Figure 6

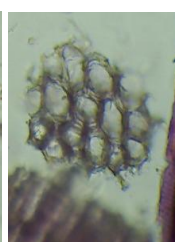


Figure 7



Figure 8

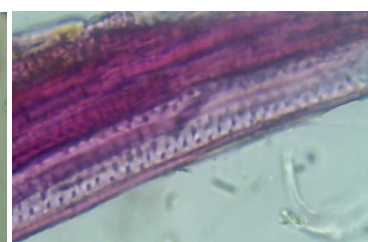


Figure 9



Figure 10

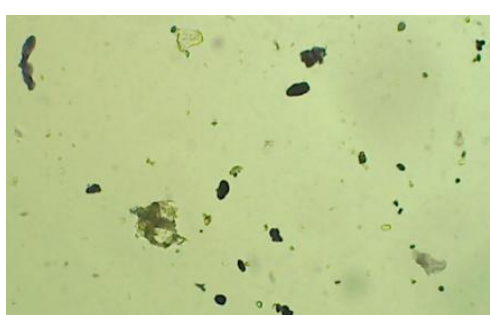


Figure 11

Figure 1-11: Microscopic Characters of Roots and Rhizomes of *Collinsonia canadensis*

Figure 1- T. S of root or rhizome showing cork; figure 2- showing endodermis; figure 3- cortex; figure 4 – pith; figure 5- staining of xylem vessels with safranin and fast green; figure 6 – cork; figure 7- lignous parenchyma; figure 8- calcium oxalate crystals; figure 9 – reticulate or pitted type xylem vessels; figure 10- lignified fibres and pitted tracheids and figure 11- kidney shaped, ovoid or oblong starch grains.

CONCLUSIONS

Different pharmacognostic and physiochemical standards including macroscopy, microscopy, quantitative studies, foreign matter, ash values, extractive values and loss on drying were generated to substantiate data on *Collinsonia canadensis*. The study was carried out for exploring the above parameters of the plant.

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